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ABSTRACT

This introduction to the Internet explains what it is, how to use it, and how it can be useful to those with an interest in competency-based education. The Internet is a network of over 14,000 networks as of August 1993, with 1,000 being added per month, and at least 1 million machines and 20 million people connected to it. There are several levels of connection. Anyone with Internet-capable electronic mail is on the Internet, but a "full" or direct connection that uses relatively complex software like Gopher and FTP (file transfer protocol) is generally available only to users on a local area network. Ways to access the Internet, including the use of gophers, USENET, and file transfer protocols, are discussed. There are currently no gopher servers or subsystems dedicated to competency-based education. The best sources for information on education are the Department of Education gopher, the ERIC system, and the VocNet listserv sponsored by the National Center for Research in Vocational Education. Ten resources are listed for further information. (SLD)

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USING THE INTERNET IN COMPETENCY BASED EDUCATION

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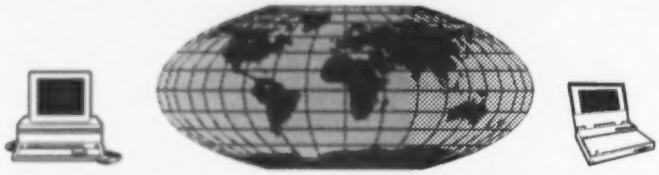

WHAT IS THE INTERNET?

The world's largest computer *network*...actually it's a *network of networks,* all free to exchange information. *So what's the big deal?* The major accomplishment is that by using *common standards [TCP/IP or Internet Protocol],* existing networks can connect dissimilar software and hardware. Before the Internet, IBM equipment pretty much linked only to IBM, Digital Equipment Corporation systems connected easiest to other Digital computers, etc. The result of common connecting standards:

> Over 14,000 networks [as of 8/93] were in the Internet, with 1000 being added per month. At least a million machines [many individual networks consist of multiple machines] are connected along with 20 million people; and although it's the most *"open"* system in the world, over half of the network is commercial and not available to the general public.

Who actually owns the Internet and where is it located? There is really no owner--it is "owned" by the 15 million who use it daily and the organizations, both public and private that pay for the connection. It is *located* all over the world, including on the continent of Antarctica.

And, contrary to what you might think, the Internet is ***not free.*** Organizations, like universities, school systems, IBM, and Citicorp, all pay access costs. However, much information, particularly government and university-funded work, is openly accessible, once you are connected.

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WHAT CAN YOU FIND ON THE INTERNET?

- Electronic mail with international capability, news groups, the Library of Congress, satellite weather pictures, a bookstore with 250,000 books, university libraries, the National Institute of Health, electronic journals, the Educational Resources Information Center, Shakespearean plays in "full-text," databases, computer software, and the use of highly specialized programs.

Eclectic? Absolutely. Useful? Absolutely.

The Internet is a "work in progress," not a done deal. Recently, someone commented: *"It will empower you, break your heart, or make you on top of the world. It will change your life!"* You will hear the metaphor of the "Information Super Highway"--goes very fast; no rest stops or tour guides. Some say it's a house where there are shared keys. Or that it's growing in all directions and no one is in charge. Whatever you hear or read, no one person is an Internet "expert" yet. *And what do you call somebody who can make efficient use of all this? An Internaut! And where do they do their work? In cyberspace!*

WHAT WON'T YOU FIND ON THE INTERNET?

Time magazine, the *Washington Post*, *Dow-Jones* stock quotes, purchasing of airline tickets, and books by Stephen King. Although the quantity of public domain information is vast, it does not include materials produced in the private domain.

Many private services, like CompuServe, are now "available" through an Internet connection. However, when you reach these services you must either join with a credit card or already have a billable account. Further, although companies like Citicorp, IBM, and Coca-Cola are "on" the Internet, they are set up so that they can access public information but so that other users cannot access them. It is extremely unlikely that a computer "hacker" could find the "secret formula" to Coca-Cola [either regular or classic] through the Internet!

INTERNET AND SCHOOLS

Imagine schools where students could get turned on to a subject and instantly be zapping toward lessons from experts on the topic. Videoconferencing between students, teachers, and businesses worldwide. Could this technology help improve skills and lead to a better-trained workforce, greater productivity, higher wages, lower rates of crime and poverty? The best education could be available anywhere, anytime. Currently, an exhibit of fifteenth century manuscripts [pictures and text] from the Vatican Library is available from the Library of Congress! Teachers can "Ask Eric" direct questions for resources for K-12 education.

Many K-12 school systems are using the Internet on a daily basis. The most frequent use is electronic mail, but searching for information is also common. Some school districts have their own "gopher," making their own networked information easily accessible to anybody on the Internet.

One of the most important aspects for educators to keep in mind is that the "electronic highway" is becoming THE pipeline for the 20st century, and is destined for an ever-important role in the 21st century. Citizens will need to know how to communicate, find and access constantly changing information, take courses, hold video conferences, meet people of similar interests, and ?????? It is a simple fact that telecommunications will play an important role in everyone's life.

HOW DO YOU "GET ON" THE INTERNET?

There are several levels of connections to the Internet. Everyone with Internet-capable electronic mail is "on" the Internet, and this includes over 20 million people worldwide. However, a "full" or direct connection would allow the use of relatively complex software that is on the "net," and this is generally available only to users on a Local Area Network. These users can then make use of software like Gopher and FTP [file transfer protocol], and universities were some of the first organizations to be connected.

Popular service providers like America Online and Delphi offer a user-friendly interface between the customer and the Internet. This means that users do not have full access but they can use simple and inexpensive communications software. Prices begin at about $10 per month.

Private individuals can gain direct Internet access by paying fees to an intermediary provider. This requires relatively complex software and an individual "IP" [Internet Protocol] address for each user. The connection can be completed through dialup modems and a SLIP [Serial Line Internet Protocol]. Prices for this level of service vary considerably, and often include a hookup fee plus charges of about $20/hour.

LOCATING "ADDRESSES" OR NETWORKS ON INTERNET

IS THERE A COMPLETE DIRECTORY OF PARTICIPANTS ANYWHERE? No. ☹
However, some organizations do have search able databases. Thus, if you are on CompuServe or America Online, you can easily search people on your own network. *So how do you find a*

username?...Call them on the phone!?! Pretty low tech! Who said Internet was perfect? People are working on this flaw right now.

By using Internet mail, you have the ability to send mail to millions of people. For example:

president@whitehouse.gov [Dear Socks:] or vice.president@whitehouse.gov

All messages you *receive* show the complete "address," which you can easily use to send a return message. Don't be surprised if the address has a lot of strange punctuation; *every* character must be included for it work; space and punctuate EXACTLY as you see the address on your screen. For example: seguina@columbia.dsu.edu [There is usually a last name/first initial at the beginning; the name of the "host" after the at sign "@"; "edu" signifies an Internet address at an educational institution, while CompuServe and America Online use "compuserve.com" and "aol.com. The suffix "com" is for a commercial network.

Virtually all of the "online systems," including Prodigy, CompuServe, America Online, Delphi, AT & T Mail, MCI, etc., have gateways allowing for Internet mail exchange. Thus, from an Internet account at an educational institution a student or instructor can send and receive mail from many networks without being a paying member of those online systems.

Many "Letters to the editor" portions of major magazines print their Internet address. *TIME* magazine uses the America Online Network, which has a connection to Internet mail. When *TIME* magazine began using the America Online system a few months ago, they were inundated with messages. It's never been easier for people to communicate nationally or internationally than now.

THE INTERNET HAS MANY FACES & FACETS

Unlike most "systems," the Internet does not have one "look" or a friendly "face." This is because it is a *network of independent networks*. And, in practice, this means that the software used by the Library of Congress is unlike that used by the University of Illinois' Weather Machine [it gives hourly satellite pictures]. And, the undirected, ever-changing nature of the Internet will never allow for a single user-friendly interface. However, many "front-ends," including graphical user interfaces [GUI's] are available for the common areas of the Internet. The "Gopher" is one such tool that has both commercial and shareware software available for use.

As a *network of networks*, the Internet has many avenues of connectivity. Electronic mail can be easily handled through virtually any type of service or dialup location. However, the most powerful aspects of the Internet are only available from a network that is *connected* through *client-server* software. This type of software is now available for both the Windows and Macintosh environment, while it had been confined to computers running UNIX programs. The newest software allows for client-server dialup connection to an Internet host, making the vast resources available from any location.

Major Internet features/systems:

Electronic mail - Arguably the most useful feature. One capability of Internet mail is joining ListServ "groups," which mail one item to thousands of people on various networks. *[There are many ListServ groups in education and vocational education, including VocNet and PerkAct]*

ftp - File transfer protocol, which allows free exchange of files with machines running the ftp protocol. *[relatively difficult without a Macintosh or Windows interface]*

Gopher - A simple, menu-driven interface that allows navigating and finding sources with other gopher servers. *[items must be "linked" to a Gopher, and much of the net is not linked in this manner]*

Telnet - A method to connect to another computer and use it as if you were a terminal *on the system*. Many systems allow *anonymous* use, but information of a proprietary nature [say items from *Dow Jones* or *Time* magazine] would require payment.

USENET - Newsgroups on thousands of subjects, both serious and frivolous.

WWW - The world wide web is a graphical method of linking information, much like hypercard and hypertext, except that the information requested from a screen could be anywhere on the Internet, and in graphical, text, or audio format. Considered the "new wave."

These major features can be used both separately and in combination. For example, the Gopher menu can take you to a source that would be a telnet connection to a database. Also, Gopher will let you send files [commonly text files] to an email address.

HERE COMES THE GOPHER

Despite all the hype, the Internet is very complex if the user does not have "friendly" tools or programs. And, although many programs have been written to make the Internet more user-friendly, the most popular program is called "Gopher." It is used by over one thousand sites worldwide.

- *Gopher?* A large rodent; the official mascot of the University of Minnesota. This communications program was originated at UMN--a gopher tunnels underground and out of sight, much as this information retrieval program does. The gopher's an industrious little animal, always busy scurrying about on behalf of its family. It's also a pun-- *go fer* because Gopher goes *fer* your files.

GOPHER is easy to use and can be used by beginners or experienced users. It helps us retrieve info from machines on the Internet that also have Gopher software. It uses a friendly, menu-based interface, called a *gopher client*. Much of the complicated part of other types of networks is eliminated by using a gopher program. There is a certain amount of wandering from menu to menu that you will need to do, but you will get to useful information fairly quickly. Some of the menu items are files that Gopher can display, mail to you, or copy to your computer. The Internet Gopher combines features of electronic bulletin boards and databases into an information distribution system that allows you to either browse or search through information as diverse as: library databases, recipes, phone books, news, weather, travel information, etc.

Gopher users can point the arrow keys to "burrow" deeper into the net. This is usually the fastest, easiest, and most fun way to wander around the Internet looking for and frequently finding the information you need. Use can be very slow during peak hrs.

HOW CAN I ACCESS GOPHER ON THE INTERNET?

Many commercial services offer Internet access. However, many confine their use to electronic mail and don't provide "full" access. another way to use the Gopher is to dial at Dakota State University After the program, clicking on "Gopher" will take the user to our "host" Gopher at the University of Minnesota. The "main menu" looks like this:

```
                Internet Gopher Information Client v1.11

                Root gopher server: gopher.tc.umn.edu
--> 1. Information About Gopher/
    2. Computer Information/
    3. Discussion Groups/
    4. Fun & Games/
    5. Internet file server (ftp) sites/
    6. Libraries/
    7. News/
    8. Other Gopher and Information Servers/
    9. Phone Books/
    10. Search Gopher Titles at the University of Minnesota <?>
    11. Search lots of places at the University of Minnesota <?>
    12. University of Minnesota Campus Information/
Press ? for Help, q to Quit, u to go up a menu                Page: 1/1
```

All Gopher servers have the capability of connecting to "Search Other Gopher Servers" or similar wording, thus allowing access to other Gopher servers. If we select "8" "Other Gopher and Information Servers/" and from a meanu not shown here, select "All," the user will access the screen below:

```
                Internet Gopher Information Client v1.11
```

```
                All the Gopher Servers in the World

--> 1. Search Gopherspace using Veronica/
    2. ACADEME THIS WEEK (Chronicle of Higher Education)/
    3. ACM SIGDA/
    4. ACM SIGGRAPH/
    5. ACTLab (UT Austin, RTF Dept)/
    6. AMI -- A Friendly Public Interface/
    7. AREA Science Park, Trieste, (IT)/
    8. Academic Position Network/
    9. Academy of Sciences, Bratislava (Slovakia)/
    10. Acadia University Gopher/
    11. Action for Blind People/
    12. AgResearch Wallaceville, Upper Hutt, New Zealand/
    13. Agricultural Genome Gopher/
    14. Alamo Community College District/
    15. Albert Einstein College of Medicine/
    16. Alpha Phi Omega/
    17. American Chemical Society/
    18. American Demographics/

Press ? for Help, q to Quit, u to go up a menu          Page: 1/73
```

This supplies an alphabetical list from the entire world! Note also that the lower right hand corner shows that this screen is *Page: 1 of 73 total screens, or 1299 Gophers!* The Gopher is an outstanding tool to begin exploring the Internet. As you begin to use the Gopher, you'll notice that there isn't a great deal of consistency from one menu to another. It can take some experimenting and poking around to figure out where people have hidden things; but invariably it's worth the effort.

Gopher is a lot harder to talk or read about than to use. So play with it--you may make some mistakes, but that's part of learning. It's difficult to give a better sense of how Gopher is organized, due to the way it has been developed. Gopher also has its own search tool, called *Veronica [very easy rodent-oriented net-wide index to computerized archives].* Veronica has a big database of available services. It tracks all the Gopher menus that can be accessed or indirectly from the mother Gopher in Minnesota. Veronica is just another search tool and you can find it under "other Gophers." Just as you browse through the stacks in a library, seeing what looks interesting, you will need to do the same with Gopher--there's no substitute for exploring. Soon you'll find where the "good stuff" is. And you'll probably find some useful services that you didn't know existed.

MAILING LISTS

What is a mailing list? It is a means of sharing information jointly to a group of people who share common interests. When you send one message, it automatically goes to everybody else on the list, which could mean hundreds of people. As you become more Internet literate, you will see announcements for either "ListServ" systems or special interest groups [SIG]. The Gopher and

other tools will find "lists of lists," or lists within topic areas. However, these mailing lists are not "in" Gopher.

You can get yourself on a lot of these mailing lists, but be careful--you might end up with 400 new messages in your mailbox the next morning! Junk mail is still junk mail, even electronically. One reference book on the Internet describes more than 800 lists and suggests that this is a good place to start using Internet. To subscribe to a particular forum, the usual convention for being added to a mailing list is to send a message to *listserv@host*. Some lists may not provide this capability. After subscribing to a list, messages that are sent to the mailing list will appear directly in your electronic mailbox. Some mailing lists are unmoderated, allowing free-form discussion. These usually receive heavy traffic, and some of the messages may be "junk." Moderated lists are first read and then forwarded, resulting in longer turnaround time. It is important to "signoff" from mailing lists you no longer wish to receive. Consult references sources for further information. In the tradition of computer science, things can get pretty complex and frustrating when looking for mailing lists to join.

USENET

USENET is another method of sharing special topics. This is another part of Internet that is not "in" Gopher. However, Gopher may refer to lists or news groups, which you can access through other tools. There are several thousand groups on virtually every topic imaginable, with titles like *comp.os.ms-windows.apps*. All groups are openly accessible but users need to have "newsreader" software, which normally resides on a computer network. "Trumpet" and "WinTrumpet" are commonly used packages that allow reading, downloading, and printing text messages. Users can select from both the groups and from the individual "postings." Readers can respond and post to the group or respond individually.

Example of news groups:

soc.culture.nordic	
alt.education.distance	*alt.sewing*
rec.arts.tv.soaps	*rec.food.cooking*

FTP ACCESS

Internet lets you use anonymous file transfer protocol [FTP] to gain copies of public domain and shareware computer software, text, and other information contained in files made available in a public directory in a computer anyplace on the Internet. As with most of the challenges and opportunities offered by Internet, the main problem is locating the information or software you want. You can obtain a list of Internet sites accepting anonymous FTP from the host *pilot.njin.net* in the director *pub/* and the file *ftp-list*

A tool used to find files is Archie, a program that queries a database maintained by the Computer Science Dept. of McGill University. The database contains a list of software available through FTP to hosts connected to the Internet network.

To use the interactive system: Connect to host *quiche.cs.mcgill.ca* with telnet. Log-in as user *archie* [no capitals, no password required.] The system prints a banner message and status report. Type *help* for further information.

HOW TO FIND COMPETENCY BASED INFORMATION

There are currently no Gopher servers or subsystems dedicated to competency based education. The writer used a tool called "Veronica" to search for the words "competency" and "based" on all of the Gopher servers. Veronica searched both the titles and subtitles but did not find any mention of these words.

The best sources for information on education is the U.S. Department of Education Gopher. It can be found by "all the Gophers in the world" and eventually getting to Washington, D.C. To go directly to the USDOE Gopher, input: *gopher gopher.ed.gov* Also included are topics on "Grants," "Goals 2000," and "School to Work Opporunity Act." Further, there is a connection to "Other Education Gopher Servers."

The USDOE Gopher also has connections to the Office of Adult and Vocational Education. Menu items here include "Tech Prep," "State Contact," and "Cooperative Learning."

Since ERIC documents are produced with public tax money, they are readily available on several Internet computers. Sources can be reached both through Gopher and Telnet, and most databases contain full searching capabilities. Thus, you can get all of the ERIC documents directly through the Internet.

An additional source of possible information would be the VocNet listserv sponsored by the National Center for Research in Vocational Education. To automatically subscribe and receive all of the electronic mail under the broad topic "vocational education," send a message to listserv@cmsa.berkeley.edu Include no "subject," but in the body of the message input: SUBSCRIBE VOCNET FIRSTNAME LASTNAME You will get an automatic response and then get subsequent mailings.

ELECTRONIC BODY LANGUAGE "Emoticons" or smileys"

:-)	**Happy smiley**	**>:>**	**Devilish**	**;-)**	**Winking**
:-D	**Laughing**	**:-(**	**Sad, frowning**	**:-@**	**Screaming**
%-)	**Confused**	**:-/**	**Skeptical**	**>:<**	**Angry**
:-P	**Nyahhh!**	**: < ...**	**Crying**	**:D**	**Big smile**

Seinfeld characters: **Kramer==:-}** **George (:{**
Elaine &:) **Jerry =:->**

FOR MORE INFORMATION:

Internet for Dummies. John Levine. IDG Books, 1993.
Internet: Getting Started. April Marine. SRI International, 1994.
The Internet Message. Marshall Rose. Prentice-Hall Publishing.
Internet World Magazine. Meckler Corporation. *[Editor is on the Internet: meckler@jvnc.net]* $29/yr subscription.
New Riders' Official Internet Yellow Pages. Christine Maxwell. New Riders Publishing, 1994.
Online Access Magazine. $29.70/yr. (312) 573-1700
Riding the Internet Highway. Sharon Fisher. New Riders Publishing, 1993.
The Whole Internet Users Guide and Catalog. Ed Krol. O'Reilly and Associates, 1993.
Windows Internet Tour Guide. Michael Fraase. Ventana Press, 1994.
Zen and the Art of the Internet. Brendan Kehoe. Prentice-Hall Publishing.

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